

CLAIMS:

59. A genetic construct, comprising:
a conditionally lethal first gene expressible in a
plant cell of a plant; and
a second gene expressible in said plant cell, said
second gene, when expressed in said plant cell, conferring a
non-naturally occurring trait of interest on said plant cell.

60. The genetic construct of claim 59, wherein the second
gene comprises nucleic acid which is heterologous to said plant
cell.

61. The genetic construct of claim 60, wherein the second
gene codes for a pharmaceutically active compound.

62. The genetic construct of claim 60, wherein the second
gene codes for an industrially useful enzyme.

63. The genetic construct of claim 60, wherein the second
gene codes for rennin and/or hirudin.

64. The genetic construct of claim 59, wherein the second
gene, when expressed, produces a measurable change in a
phenotype of said plant cell.

65. The genetic construct of claim 59, wherein the second
gene codes for one of a protein, peptide or an anti-sense RNA.

66. The genetic construct of claim 59, wherein the second
gene codes for an input or output trait conferrable on said
plant cell.

67. The genetic construct of claim 59, wherein the
conditionally lethal gene is an oncogene.

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68. The genetic construct of claim 59, wherein the conditionally lethal gene is oncogene 2 from *Agrobacterium tumefaciens*.

69. The genetic construct of claim 59, wherein the conditionally lethal gene is adapted to be expressed in said particular plant in response to a chemical or physiological stress applied to said plant cell.

70. The genetic construct of claim 59, wherein the conditionally lethal gene is configured to express a gene product lethal to said particular plant upon application of a particular exogenous substance to said plant cell.

71. The genetic construct of claim 59, wherein the conditionally lethal gene is selected from the group consisting of oncogene 4 under the control of a promoter of a low temperature inducible gene from *Arabidopsis*, a gene coding for methoxatin dehydrogenase, a gene coding for rhizobitoxine synthase, and a gene coding for phosphonate monoester hydrolase.

72. The genetic construct of claim 59, further comprising an inducible promoter in operable association with said conditionally lethal first gene.

73. The genetic construct of claim 59, further comprising a tissue-specific promoter in operable association with said conditionally lethal first gene.

74. A plant transformation vector comprising the genetic construct of claim 59.

75. A plant transformation vector comprising the genetic construct of claim 59.

76. A transgenic plant, comprising:

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a conditionally lethal first gene expressible in a plant cell
of said transgenic plant; and

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Re 6/26
5 a second gene expressible in said plant cell of said
transgenic plant, said second gene, when expressed in said
plant cell, conferring a non-naturally occurring trait of
interest on said plant cell.

A
81. The transgenic plant of claim 80, wherein said
transgenic plant is a variety of Brassica.

B
82. The transgenic plant of claim 81, wherein said second
10 gene confers upon said variety of Brassica a high oleic, low
linoleic acid genotype.

A
83. The transgenic plant of claim 81, wherein said
variety of Brassica is variety AG-019 or derivatives thereof.

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84. A method for selectively removing at least one plant
15 from a growing environment, comprising:

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transforming at least one plant cell with a genetic
construct including:

a conditionally lethal first gene expressible in
said at least one plant cell; and

20 a second gene expressible in said at least one
plant cell, said second gene, when expressed in said at least
one plant cell, conferring a non-naturally occurring trait of
interest on said at least one plant cell;

regenerating the at least one plant cell to at least
25 one whole plant; and

applying a chemical agent to said at least one whole
plant, said chemical agent being configured to be converted

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into a phytotoxic agent of said at least one whole plant by one or more gene products of said conditionally lethal gene.

85. The method of claim 84, wherein said applying said chemical agent comprises applying said chemical agent in an amount selected to effect a sub-lethal level of said phytotoxic agent in said at least one whole plant upon said conversion by said one or more gene products of said conditionally lethal gene.

86. The method of claim 85, further comprising visually identifying a sub-lethal phenotype of said at least one whole plant.

87. The method of claim 84, wherein the genetic construct comprises oncogene 2 as the conditionally lethal gene, and wherein the chemical agent comprises an indoleamide or a related derivative.

88. The method of claim 87, wherein the indoleamide is naphthalene acetamide.

89. The method of claim 84, wherein the at least one whole plant is a variety of Brassica.

90. The method of claim 89, wherein said second gene confers upon said variety of Brassica a high oleic, low linoleic acid genotype.

91. The method of claim 90, wherein the variety of Brassica plant is variety AG-019 or derivatives thereof.

92. A method for selecting a germinating seed or plant embryo comprising oncogene 2 as a transgene, comprising:

providing at least one transgenic plant cell of a plant seed or plant embryo, said at least one transgenic plant cell including oncogene 2 as a transgene;

culturing the at least one transgenic plant cell on a medium comprising an indoleamide or a related derivative; and

5 visually identifying the at least one transgenic plant cell by its expression of an auxin-overproduction phenotype. 88

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93. The method of claim 92, wherein said medium further comprises an auxin transport inhibitor. 89

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94. The method of claim 93, wherein the auxin transport inhibitor is selected from the group consisting of N-(1-naphthyl)phthalamic acid, 2,3,5-triiodobenzoic acid, 9-hydroxyfluorene-9-carboxylic acid, erythrosine, eosine, fluorescein, semicarbazone, and ethanphon. 88

15 95. The method of claim 92, wherein the indoleamide is naphthalene acetamide and the auxin transport inhibitor is naphthylphthalamic acid. 88

20 96. The method of claim 92, wherein the at least one plant cell comprises a seed or a plant embryo. 88

97. The method of claim 92, wherein the at least one plant cell is derived from a variety of Brassica. 3

25 98. The method of claim 97, wherein the variety of Brassica is a variety having a high oleic acid, low linoleic acid profile. 3

99. The method of claim 97, wherein the variety of Brassica is variety AG-019 or derivatives thereof. 88

100. The method of claim 92, further comprising transferring the at least one transgenic plant cell to a second medium free from indoleamide and recovering the at least one transgenic plant cell. 88

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201. The method of claim 100, wherein the second medium comprises naphthalene acetic acid.

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202. The method of claim 92, further comprising transforming at least one plant cell with oncogene 2 to obtain said at least one transgenic plant cell.

203. A method for producing a transgenic plant comprising oncogene 2 as a transgene, comprising:

providing at least one transgenic plant cell of a plant seed or plant embryo, said at least one transgenic plant cell including oncogene 2 as a transgene;

culturing the at least one transgenic plant cell on a medium comprising naphthalene acetamide and an auxin transport inhibitor;

visually identifying the at least one transgenic plant cell by its expression of an auxin-overproduction phenotype; and

transferring the at least one transgenic plant cell to a second medium comprising naphthalene acetic acid to recover the at least one transgenic plant cell.